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CLAIMS

[Claim(s)]

[Claim 1] The liquid crystal projector of a Uichi Hidari pair which projects on reflex time the image for left eyes picturized with binocular parallax, and the image for right eyes with the same polarization from which the polarization direction changes, The reflecting mirror which reflects one projection image of the liquid crystal projector of this pair, and changes the polarization direction in that case, The screen which is projected and compounds the projection image reflected with this reflecting mirror, and the projection image of another side of the liquid crystal projector of said pair, The liquid crystal projection arrangement for stereoscopic vision according to claim 1 characterized by providing the polarization glasses which carry out stereoscopic vision of the object for left eyes and the image for right eyes which the polarization directions differed by the left eye and the right eye, and were projected on said screen.

[Claim 2] The liquid crystal projector of said pair is a liquid crystal projection arrangement for stereoscopic vision characterized by being 45-degree linearly polarized light projection mold liquid crystal projector which projects the image of the linearly polarized light which has the 45-degree polarization direction to the horizontal or vertical polarization direction.

[Claim 3] The liquid crystal projector of said pair is a liquid crystal projection arrangement for stereoscopic vision according to claim 1 characterized by providing the quarter-wave length plate which is the linearly polarized light projection mold liquid crystal projector which projects the image of the linearly polarized light, and changes the linearly polarized light into the circular polarization of light in a front face.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the liquid crystal projection arrangement for stereoscopic vision which could be made to carry out stereoscopic vision of the image projected by the liquid crystal projector of a pair with the polarization glasses with which the polarization directions on either side differ.

[0002]

[Description of the Prior Art] The three-dimensions display unit which shows 3-dimensional scenography can be divided into the 3-dimensional scenography method which gives the image information for right-and-left 2 eye independently to both eyes, respectively, and expresses depth, and the three-dimensions image method which permits the observation from the view of arbitration in limited within the limits, and expresses depth to it. A 3-dimensional scenography method is also called 2 eye type, and the projection CRT equipment 1 for stereoscopic vision shown in drawing 5 arranges the linearly polarized light plates 3L and 3R of a pair with which the polarization direction intersects perpendicularly mutually in the front face of two sets of the color projection CRTs 2L and 2R prepared for the object for left eyes, and right eyes, and projects on a screen 5 the video signal of the right and left picturized with binocular parallax through a half mirror 4 from the color projection CRTs 2L and 2R. The image for right eyes which the image for left eyes projected from color projection CRT 2 for left eyes L penetrated the half mirror 4 as it was, and was projected on the screen 5, and was projected from color projection CRT 2 for right eyes R is deflected by the right angle in an optical path by the half mirror 4, and is projected on a screen 5. The image projected on the screen 5 can have and carry out stereoscopic vision of the binocular parallax by wearing and seeing the polarization glasses 6 with which the polarization direction consists of a linearly polarized light plate which is in orthogonality relation mutually by the left eye and the right eye.

[0003] Generally, the projection image of the color projection CRTs 2L and 2R is a light wave which it does not polarize in the specific direction but vibrates in all the directions in a right-angled flat surface to the travelling direction of light. Therefore, if it remains as it is, the polarization glasses 6 cannot separate into right and left, but it is necessary to make the polarization direction change with polarizing plates 3L and 3R with which the polarization direction intersects perpendicularly. For this reason, the vertical polarizing plate with which the oscillating direction outputs polarization perpendicular to an optical axis to linearly polarized light plate 3L so that the vertical polarization and horizontal polarization from which the polarization direction does not change by transparency or reflection of a half mirror 4 in this example may be acquired is ***** for horizontal polarizing plates with the oscillating direction level [linearly polarized light plate 3R] to an optical axis again. Consequently, the image for right eyes in which the image for left eyes which penetrated the half mirror 4 was reflected by the half mirror 4 with vertical polarization is projected on a screen 5 with horizontal polarization, and stereoscopic vision is carried out through the polarization glasses 6.

[0004]

[Problem(s) to be Solved by the Invention] The above-mentioned conventional projection CRT equipment 1 for stereoscopic vision the image which the color projection CRTs 2L and 2R project It leads to a half mirror 4 through the polarizing plates 3L and 3R of a pair with which the polarization direction established in the front face of a projection lens intersects perpendicularly. It considers as the configuration which projects the image for left eyes, and the image for right eyes on a screen 5 in piles on the same optical axis, and the polarizing plates 3L and 3R and half mirror 4 of a pair with which the polarization direction intersects perpendicularly are a colander optic from need *****. However, the half mirror 4 is expensive and the incident light shaft of color projection CRT 2L for left eyes to a half mirror 4 and the incident light shaft of color projection CRT 2R for right eyes to a half mirror 4 are made to intersect perpendicularly mutually. The optical-axis adjustment for arranging an outgoing radiation optical axis and making it project at right angles to a screen 5 is also complicated. The color projection CRTs 2L and 2R of a three-pipe type fairly not only weight but magnitude And a certain sake, There was a technical problem of being hard to introduce in ordinary homes except for the home blessed with the location which can secure very big viewing-and-listening space.

[0005] On the other hand, the attempt which installs two liquid crystal projectors which are in dominance compared with the color projection CRTs 2L and 2R etc. in respect of space-saving-izing, adjusts the projection direction so that each projection core may agree in the central point of a screen, wears polarization glasses, and enables it to appreciate 3-dimensional scenography is also made again. however, the reason for adding a polarizing plate ahead of a projection lens, and changing the polarization direction of a projection image into arbitration, since the image projected from a liquid crystal projector has required polarization in the direction of specification [since former] -- not going -- this sake -- the liquid crystal projector itself -- for example, a vertical polarization projection mold or a horizontal polarization projection mold -- as -- the polarization direction had to consist of two kinds of projectors which intersect perpendicularly mutually. That is, the configurations of the optical system inside a liquid crystal projector needed to be made to differ by the object for left eyes, and the object for right eyes, when the polarization direction arranged two sets of the same liquid crystal projectors, it compared, and the equipment configuration is complicated and had technical problems, such as also attaching a manufacturing cost highly.

[0006] This invention aims at carrying out a separation check by looking through the polarization glasses with which the polarization directions on either side differ in the image of the right and left picturized by having binocular parallax, and making stereoscopic vision possible by reflecting one projection image in the fixed direction with a reflecting mirror among the projection images of the liquid crystal projector of a Uichi Hidari pair which required the same polarization, changing the polarization direction, and compounding on the projection image of another side on a screen.

[0007]

[Means for Solving the Problem] The liquid crystal projector of a Uichi Hidari pair which projects on reflex time the image for left eyes which this invention solved said technical problem and was picturized with binocular parallax, and the image for right eyes with the same polarization from which the polarization direction changes, The reflecting mirror which reflects one projection image of the liquid crystal projector of this pair, and changes the polarization direction in that case, The screen which is projected and compounds the projection image reflected with this reflecting mirror, and the projection image of another side of the liquid crystal projector of said pair, The polarization directions differ by the left eye and the right eye, and it is characterized by providing the polarization glasses which carry out stereoscopic vision of the object for left eyes and the image for right eyes which were projected on said screen.

[0008] Moreover, this invention is a linearly polarized light projection mold liquid crystal projector which projects that it is 45-degree linearly polarized light projection mold liquid crystal projector which projects the image of the linearly polarized light in which the liquid crystal projector of said pair has the 45-degree polarization direction to the horizontal or vertical polarization direction, or the image of the linearly polarized light, and is characterized by providing the quarter-wave length plate which changes the linearly polarized light into the circular polarization of light in a front face etc.

[0009]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to drawing 1 thru/or drawing 5. Drawing 1 shows 1 operation gestalt of the liquid crystal projection arrangement for stereoscopic vision of this invention, and drawing 2 to explain the relation of the reflecting mirror and the linearly polarized light which were shown in drawing 1, and drawing 3 are the explanatory views showing that 45-degree linearly polarized light turns at 90 degrees with a reflecting mirror.

[0010] The liquid crystal projection arrangement 11 for stereoscopic vision shown in drawing 1 projects the video signal for left eyes with the same polarization direction, and the video signal for right eyes from the liquid crystal projectors 12L and 12R of a pair. Reflect one projection image with a reflecting mirror 13, change the polarization direction, and the projection image and the projection image of another side which were reflected with the reflecting mirror 13 are compounded on a screen 14. By the polarization glasses 15 with which the polarization directions differ separating an image on either side, and checking by looking by the left eye and the right eye, it considers as the configuration which carries out stereoscopic vision.

[0011] Each of liquid crystal projector 12L for left eyes shown in an example and liquid crystal projector 12R for right eyes projects the image of 45-degree linearly polarized light which has the 45-degree polarization direction to the optical axis which meets in the projection direction, and since it is the same model, the mutual polarization direction is completely in agreement. Moreover, in the example, the right pair of the liquid crystal projector 12L for left eyes is mostly carried out to a screen 14, and liquid crystal projector 12R for right eyes is arranged so that the mirror image (an alternate long and short dash line shows to drawing 1) by the reflecting mirror 13 may carry out a right pair to a screen 14 mostly. However, it has predetermined spacing mutually and the mirror image of liquid crystal projector 12L for left eyes and liquid crystal projector 12R for right eyes by the reflecting mirror 13 is installed, and it is adjusted so that the core of each projection optical axis may agree in the central point of a screen 14, so that a field angle common on a screen 14 may be stretched.

[0012] In addition, although it has fixed as it thinks best so that the mirror image of liquid crystal projector 12R for right eyes may become top-and-bottom reverse to liquid crystal projector 12L for left eyes, the arrangement posture of liquid crystal projector 12R for right eyes When the video signal of ** - is inputted into the liquid crystal projectors 12L and 12R by which the optical design was carried out also as right and left, without producing an up-and-down trapezoidal distortion so that a projection center line may carry out incidence to a screen 14 with the 5-10-degree placing angle theta, this - the image gap by the up-and-down trapezoidal distortion is generated -- not making -- in addition -- and it is because it is the optimal arrangement for making it do on a screen 14 about two images, the object for left eyes, and the object for right eyes.

[0013] Moreover, it is a premise for the video signal for left eyes and the video signal for right eyes to have binocular parallax, and to be picturized, and video-signal sending-out devices, such as a video tape recorder (VTR) and a laser disc player (LDP), or a Hi-Vision signal sending-out device, the video-signal sending-out device of computer graphics, etc. are used here as source of video signal 16 for left eyes L, or source of video signal 16 for right eyes R. Moreover, in order to synchronize a projection image on either side, the synchronizing signal generator 17 is connected common to the sources 16L and 16R of a video signal on either side, and the synchronous drive of the sources 16L and 16R of a video signal is carried out based on the synchronizing signal which this synchronizing signal generator 17 generates.

[0014] By the way, although change is seen in the polarization direction neither about vertical polarization nor horizontal polarization when there are two kinds of light which polarization required like common knowledge, the linearly polarized light and the circular polarization of light, and the linearly polarized light is reflected with a reflecting mirror 13, it is also known that the 90-degree polarization direction will change about 45 degree polarization of slanting. Therefore, 45 degree polarization of slanting which it was projected from liquid crystal projector 12 for right eyes R, and carried out incidence to the reflecting mirror 13 changes with reflection to 45 degree polarization of reverse slanting. More in detail, as shown in drawing 2, it is the linearly polarized light. If Normal t is

stood in the probe index to a reflecting mirror 13, the flat surface containing Normal t sets to y the line which crosses the reflector of a reflecting mirror 13 and the straight line within the reflector 13 which intersects perpendicularly with Line y is set to x and x and t -- although t and y intersect perpendicularly mutually further -- general -- the wave which is vibrating in the field containing t and y -- p wave The wave which is vibrating in the field containing x is called s wave. However, as the light which is not p wave or s wave, either, and carries out incidence to a reflecting mirror 13 while vibrating in the 45-degree direction to x and y was shown in drawing 3, the 90 degrees of the oscillating directions will be bent by reflection.

[0015] That is, like an example, the projection image for right eyes reflected with a reflecting mirror 13 serves as 45 degree linearly polarized light of reverse slanting to the projection image for left eyes which is not reflected with a reflecting mirror 13 being 45 degree linearly polarized light of slanting, and the image for left eyes projected on a screen 14 and the image for right eyes will have the polarization direction which intersects perpendicularly mutually. And since the polarization glasses 15 for stereoscopic vision attach the linearly polarized light plate which has the 45-degree polarization direction in the object for left eyes, and right eyes and which intersects perpendicularly mutually and are constituted, the projection image of the right and left projected on the screen 14 can carry out the separation check by looking of them clearly as the image for left eyes, and an image for right eyes with the polarization glasses 15.

[0016] Thus, that what is necessary is just to prepare two liquid crystal projectors 12L and 12R of the same specification on which the polarization direction projects the same image according to the above-mentioned liquid crystal projection arrangement 11 for stereoscopic vision It compares with a color projection CRT. The far compact liquid crystal projectors 12L and 12R That what is necessary is just to install in the condition that the mirror image and liquid crystal projector 12L of another side by the reflecting mirror 13 of one liquid crystal projector 12R have the same placing include angle θ to a screen 14 Moreover, since it is released from the excessive magnitude and the weight of equipment which obstruct the spread as home use that what is necessary is just to arrange a reflecting mirror 13 so that the projection image of liquid crystal projector 12L of another side may not be kicked, spread at ordinary homes can be aimed at widely. Moreover, since it can adjust, for example to liquid crystal projector 12R by attached quantity of light *****, an image on either side can be made to project on a screen 14 by the same brightness also about the quantity of light decreased by reflection it is also possible to build a solid visual system by adding liquid crystal projector 12R of the same mold and the set of a reflecting mirror 13 to its purchase, and according to a reflecting mirror 13 at a home [finishing / one set purchase of liquid crystal projector 12L / already].

[0017] In addition, although the case where the liquid crystal projectors 12L and 12R of the pair which outputs the projection image of 45-degree linearly polarized light were used was taken for the example in the above-mentioned example, the circle deviation projection mold which projects the image which has the circular polarization of light which circles in both the directions of $**$ - as liquid crystal projector 12L for left eyes and liquid crystal projector 12R for right eyes R can also be used. If liquid crystal projector 12L for left eyes is projected on the direct screen 14 in this case, and the projection image of liquid crystal projector 12R for right eyes is reflected once with a reflecting mirror 13 and it projects on a screen 14, as shown in drawing 4 Since it has the property in which the revolution direction serves as reverse revolution by being reflected with a reflecting mirror 13, the circular polarization of light can be separated and seen through the polarization glasses incorporating the circular polarization of light plate which corresponds the image for left eyes of the circular polarization of light projected directly, and the image for right eyes which was reflected with the reflecting mirror 13 and considered as reverse revolution. That is, stereoscopic vision as well as the case where 45-degree linearly polarized light projection mold liquid crystal projector is used is possible.

[0018] Moreover, even if it does not use a circle deviation projection mold, the liquid crystal projectors 12L and 12R of a linearly polarized light projection mold can be used as they are, and stereoscopic vision with the deviation glasses of a circle deviation mold can also be made possible. That is, as shown in the liquid crystal projection arrangement 21 for stereoscopic vision shown in drawing 5, the linearly

polarized light is changeable into the circular polarization of light by making a polarization shaft and the include angle of 45 degrees, and arranging the quarter-wave length plate 22 in the front face of a projection lens. In this case, although the projection image of liquid crystal projectors 12L and 12R is changed into the circular polarization of light using the quarter-wave length plate 22, stereoscopic vision becomes possible in order that the polarization direction of one projection image may reverse-circle with a reflecting mirror 13. The linearly polarized light projection mold liquid crystal projectors 12L and 12R of the pair with the same polarization direction can be used for the liquid crystal projection arrangement 21 for stereoscopic vision, and since the thing of the same specification can be used for it by right and left also about the quarter-wave length plate 22 which moreover changes the linearly polarized light to the circular polarization of light, it can manufacture them cheaply, without increasing the class of use components.

[0019] moreover, the above -- although any example was considered as the configuration which reflects the projection image of liquid crystal projector 12R for right eyes with a reflecting mirror 13, the projection image of liquid crystal projector 12L for left eyes is reflected with a reflecting mirror, and the projection image of liquid crystal projector 12R for right eyes can also be considered as the configuration projected on the direct screen 14.

[0020]

[Effect of the Invention] As explained above, according to this invention, the image for left eyes and the image for right eyes which were picturized with binocular parallax By projecting with the same polarization from the liquid crystal projector of a Uichi Hidari pair, reflecting one projection image with a reflecting mirror, changing the polarization direction, and projecting on the projection image of another side on a screen in piles Since it constituted so that stereoscopic vision could be carried out with the polarization glasses with which the polarization directions differ by the left eye and the right eye That what is necessary is just to prepare two liquid crystal projectors of the same specification on which the polarization direction projects the same image It installs in the condition that the mirror image according a far compact liquid crystal projector to the reflecting mirror of one liquid crystal projector and the liquid crystal projector of another side have the same placing include angle to a screen compared with a color projection CRT. Since it is released from the excessive magnitude and the weight of equipment which obstruct the spread as home use that what is necessary is just to arrange a reflecting mirror so that the projection image of the liquid crystal projector of another side may not be kicked, Can aim at spread at ordinary homes widely, and a liquid crystal projector already at a home [finishing / one set purchase] Since it can adjust to a liquid crystal projector by attached quantity of light ***** also about the quantity of light decreased by reflection it is possible to build a solid visual system by adding the set of a liquid crystal projector and a reflecting mirror to its purchase, and according to a reflecting mirror, The effectiveness which was [make / an image on either side / to project on a screen by the same brightness etc.] excellent is done so.

[0021] Moreover, since this invention was made into 45-degree linearly polarized light projection mold liquid crystal projector which projects the image of the linearly polarized light which has the 45-degree polarization direction for the liquid crystal projector of a pair to the horizontal or vertical polarization direction Since the 90 degrees of the polarization directions change and they change to 45 degree polarization of reverse slanting, in case the projection image of 45 degree polarization of slanting is reflected in the polarization direction with a reflecting mirror by reflection by the reflecting mirror like vertical polarization or horizontal polarization unlike that changeless, The effectiveness of being able to carry out stereoscopic vision of the image of the right and left picturized by having binocular parallax by wearing the polarization glasses with which the polarization directions on either side differ using this property is done so.

[0022] This invention further again the liquid crystal projector of a pair It is the linearly polarized light projection mold liquid crystal projector which projects the image of the linearly polarized light. By making a polarization shaft and the include angle of 45 degrees to two sets of the liquid crystal projectors which project the image of the linearly polarized light, and arranging a quarter-wave length plate in a front face at them, since the quarter-wave length plate which changes the linearly polarized

light into the circular polarization of light was provided in the front face Stereoscopic vision is possible by changing the linearly polarized light into the circular polarization of light, and making it reverse-circle in the polarization direction of one projection image with a reflecting mirror. Since the thing of the same specification can be used by right and left also about the quarter-wave length plate which projects the same model, i.e., the same linearly polarized light image, as a liquid crystal projector, and is moreover easy to change the linearly polarized light to the circular polarization of light, The effectiveness of being able to manufacture cheaply is done so, without increasing the class of use components.

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the liquid crystal projection arrangement for stereoscopic vision which could be made to carry out stereoscopic vision of the image projected by the liquid crystal projector of a pair with the polarization glasses with which the polarization directions on either side differ.

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PRIOR ART

[Description of the Prior Art] The three-dimensions display unit which shows 3-dimensional scenography can be divided into the 3-dimensional scenography method which gives the image information for right-and-left 2 eye independently to both eyes, respectively, and expresses depth, and the three-dimensions image method which permits the observation from the view of arbitration in limited within the limits, and expresses depth to it. A 3-dimensional scenography method is also called 2 eye type, and the projection CRT equipment 1 for stereoscopic vision shown in drawing 5 arranges the linearly polarized light plates 3L and 3R of a pair with which the polarization direction intersects perpendicularly mutually in the front face of two sets of the color projection CRTs 2L and 2R prepared for the object for left eyes, and right eyes, and projects on a screen 5 the video signal of the right and left picturized with binocular parallax through a half mirror 4 from the color projection CRTs 2L and 2R. The image for right eyes which the image for left eyes projected from color projection CRT 2 for left eyes L penetrated the half mirror 4 as it was, and was projected on the screen 5, and was projected from color projection CRT 2 for right eyes R is deflected by the right angle in an optical path by the half mirror 4, and is projected on a screen 5. The image projected on the screen 5 can have and carry out stereoscopic vision of the binocular parallax by wearing and seeing the polarization glasses 6 with which the polarization direction consists of a linearly polarized light plate which is in orthogonality relation mutually by the left eye and the right eye.

[0003] Generally, the projection image of the color projection CRTs 2L and 2R is a light wave which it does not polarize in the specific direction but vibrates in all the directions in a right-angled flat surface to the travelling direction of light. Therefore, if it remains as it is, the polarization glasses 6 cannot separate into right and left, but it is necessary to make the polarization direction change with polarizing plates 3L and 3R with which the polarization direction intersects perpendicularly. For this reason, the vertical polarizing plate with which the oscillating direction outputs polarization perpendicular to an optical axis to linearly polarized light plate 3L so that the vertical polarization and horizontal polarization from which the polarization direction does not change by transparency or reflection of a half mirror 4 in this example may be acquired is ***** for horizontal polarizing plates with the oscillating direction level [linearly polarized light plate 3R] to an optical axis again. Consequently, the image for right eyes in which the image for left eyes which penetrated the half mirror 4 was reflected by the half mirror 4 with vertical polarization is projected on a screen 5 with horizontal polarization, and stereoscopic vision is carried out through the polarization glasses 6.

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EFFECT OF THE INVENTION

[Effect of the Invention] As explained above, in this invention, from the liquid crystal projector of a right-and-left pair, it has the same polarization and the image for left eyes and the image for right eyes which were picturized with binocular parallax are projected, and one projection image is reflected with a reflecting mirror, the polarization direction is changed, and it projects on the projection image of another side on a screen in piles. Therefore, since it constituted so that stereoscopic vision could be carried out with the polarization glasses with which the polarization directions differ by the left eye and the right eye That what is necessary is just to prepare two liquid crystal projectors of the same specification on which the polarization direction projects the same image It installs in the condition that the mirror image according a far compact liquid crystal projector to the reflecting mirror of one liquid crystal projector and the liquid crystal projector of another side have the same placing include angle to a screen compared with a color projection CRT. Since it is released from the excessive magnitude and the weight of equipment which obstruct the spread as home use that what is necessary is just to arrange a reflecting mirror so that the projection image of the liquid crystal projector of another side may not be kicked, Can aim at spread at ordinary homes widely, and a liquid crystal projector already at a home [finishing / one set purchase] Since it can adjust to a liquid crystal projector by attached quantity of light ***** also about the quantity of light decreased by reflection it is possible to build a solid visual system by adding the set of a liquid crystal projector and a reflecting mirror to its purchase, and according to a reflecting mirror, The effectiveness which was [make / an image on either side / to project on a screen by the same brightness etc.] excellent is done so.

[0021] Moreover, in this invention, it considered as 45-degree linearly polarized light projection mold liquid crystal projector which projects the image of the linearly polarized light which has the 45-degree polarization direction for the liquid crystal projector of a pair to the horizontal or vertical polarization direction. Therefore, since the 90 degrees of the polarization directions change and they change to 45 degree polarization of reverse slanting, in case the projection image of 45 degree polarization of slanting is reflected in the polarization direction with a reflecting mirror by reflection by the reflecting mirror like vertical polarization or horizontal polarization unlike that changeless, The effectiveness of being able to carry out stereoscopic vision of the image of the right and left picturized by having binocular parallax by wearing the polarization glasses with which the polarization directions on either side differ using this property is done so.

[0022] By this invention, the liquid crystal projector of a pair is a linearly polarized light projection mold liquid crystal projector which projects the image of the linearly polarized light, since it possessed the quarter-wave length plate which changes the linearly polarized light into the circular polarization of light in a front face, makes a polarization shaft and the include angle of 45 degrees to two sets of the liquid crystal projectors which project the image of the linearly polarized light, and arranges a quarter-wave length plate in a front face further again at them. Therefore, stereoscopic vision is possible by changing the linearly polarized light into the circular polarization of light, and making it reverse-circle in the polarization direction of one projection image with a reflecting mirror. Since the thing of the same specification can be used by right and left also about the quarter-wave length plate which projects the

same model, i.e., the same linearly polarized light image, as a liquid crystal projector, and is moreover easy to change the linearly polarized light to the circular polarization of light, The effectiveness of being able to manufacture cheaply is done so, without increasing the class of use components.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] The above-mentioned conventional projection CRT equipment 1 for stereoscopic vision the image which the color projection CRTs 2L and 2R project It leads to a half mirror 4 through the polarizing plates 3L and 3R of a pair with which the polarization direction established in the front face of a projection lens intersects perpendicularly. It considers as the configuration which projects the image for left eyes, and the image for right eyes on a screen 5 in piles on the same optical axis, and the polarizing plates 3L and 3R and half mirror 4 of a pair with which the polarization direction intersects perpendicularly are a colander optic from need *****. However, the half mirror 4 is expensive and the incident light shaft of color projection CRT 2L for left eyes to a half mirror 4 and the incident light shaft of color projection CRT 2R for right eyes to a half mirror 4 are made to intersect perpendicularly mutually. The optical-axis adjustment for arranging an outgoing radiation optical axis and making it project at right angles to a screen 5 is also complicated. The color projection CRTs 2L and 2R of a three-pipe type fairly not only weight but magnitude And a certain sake, There was a technical problem of being hard to introduce in ordinary homes except for the home blessed with the location which can secure very big viewing-and-listening space.

[0005] On the other hand, the attempt which installs two liquid crystal projectors which are in dominance compared with the color projection CRTs 2L and 2R etc. in respect of space-saving-izing, adjusts the projection direction so that each projection core may agree in the central point of a screen, wears polarization glasses, and enables it to appreciate 3-dimensional scenography is also made again. however, the reason for adding a polarizing plate ahead of a projection lens, and changing the polarization direction of a projection image into arbitration, since the image projected from a liquid crystal projector has required polarization in the direction of specification [since former] -- not going -- this sake -- the liquid crystal projector itself -- for example, a vertical polarization projection mold or a horizontal polarization projection mold -- as -- the polarization direction had to consist of two kinds of projectors which intersect perpendicularly mutually. That is, the configurations of the optical system inside a liquid crystal projector needed to be made to differ by the object for left eyes, and the object for right eyes, when the polarization direction arranged two sets of the same liquid crystal projectors, it compared, and the equipment configuration is complicated and had technical problems, such as also attaching a manufacturing cost highly.

[0006] This invention aims at carrying out a separation check by looking through the polarization glasses with which the polarization directions on either side differ in the image of the right and left picturized by having binocular parallax, and making stereoscopic vision possible by reflecting one projection image in the fixed direction with a reflecting mirror among the projection images of the liquid crystal projector of a Uichi Hidari pair which required the same polarization, changing the polarization direction, and compounding on the projection image of another side on a screen.

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MEANS

[Means for Solving the Problem] The liquid crystal projector of a Uichi Hidari pair which projects on reflex time the image for left eyes which this invention solved said technical problem and was picturized with binocular parallax, and the image for right eyes with the same polarization from which the polarization direction changes, The reflecting mirror which reflects one projection image of the liquid crystal projector of this pair, and changes the polarization direction in that case, The screen which is projected and compounds the projection image reflected with this reflecting mirror, and the projection image of another side of the liquid crystal projector of said pair, The polarization directions differ by the left eye and the right eye, and it is characterized by providing the polarization glasses which carry out stereoscopic vision of the object for left eyes and the image for right eyes which were projected on said screen.

[0008] Moreover, this invention is a linearly polarized light projection mold liquid crystal projector which projects that it is 45-degree linearly polarized light projection mold liquid crystal projector which projects the image of the linearly polarized light in which the liquid crystal projector of said pair has the 45-degree polarization direction to the horizontal or vertical polarization direction, or the image of the linearly polarized light, and is characterized by providing the quarter-wave length plate which changes the linearly polarized light into the circular polarization of light in a front face etc.

[0009]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to drawing 1 thru/or drawing 5 . Drawing for the outline block diagram in which drawing 1 shows 1 operation gestalt of the liquid crystal projection arrangement for stereoscopic vision of this invention, and drawing 2 to explain the relation of the reflecting mirror and the linearly polarized light which were shown in drawing 1 , and drawing 3 are the explanatory views showing that 45-degree linearly polarized light turns at 90 degrees with a reflecting mirror.

[0010] The liquid crystal projection arrangement 11 for stereoscopic vision shown in drawing 1 projects the video signal for left eyes with the same polarization direction, and the video signal for right eyes from the liquid crystal projectors 12L and 12R of a pair. Reflect one projection image with a reflecting mirror 13, change the polarization direction, and the projection image and the projection image of another side which were reflected with the reflecting mirror 13 are compounded on a screen 14. By the polarization glasses 15 with which the polarization directions differ separating an image on either side, and checking by looking by the left eye and the right eye, it considers as the configuration which carries out stereoscopic vision.

[0011] Each of liquid crystal projector 12L for left eyes shown in an example and liquid crystal projector 12R for right eyes projects the image of 45-degree linearly polarized light which has the 45-degree polarization direction to the optical axis which meets in the projection direction, and since it is the same model, the mutual polarization direction is completely in agreement. Moreover, in the example, the right pair of the liquid crystal projector 12L for left eyes is mostly carried out to a screen 14, and liquid crystal projector 12R for right eyes is arranged so that the mirror image (an alternate long and short dash line shows to drawing 1) by the reflecting mirror 13 may carry out a right pair to a screen 14

mostly. However, it has predetermined spacing mutually and the mirror image of liquid crystal projector 12L for left eyes and liquid crystal projector 12R for right eyes by the reflecting mirror 13 is installed, and it is adjusted so that the core of each projection optical axis may agree in the central point of a screen 14, so that a field angle common on a screen 14 may be stretched.

[0012] In addition, although it has fixed as it thinks best so that the mirror image of liquid crystal projector 12R for right eyes may become top-and-bottom reverse to liquid crystal projector 12L for left eyes, the arrangement posture of liquid crystal projector 12R for right eyes When the video signal of ** - is inputted into the liquid crystal projectors 12L and 12R by which the optical design was carried out also as right and left, without producing an up-and-down trapezoidal distortion so that a projection center line may carry out incidence to a screen 14 with the 5-10-degree placing angle θ , this - the image gap by the up-and-down trapezoidal distortion is generated -- not making -- in addition -- and it is because it is the optimal arrangement for making it do on a screen 14 about two images, the object for left eyes, and the object for right eyes.

[0013] Moreover, it is a premise for the video signal for left eyes and the video signal for right eyes to have binocular parallax, and to be picturized, and video-signal sending-out devices, such as a video tape recorder (VTR) and a laser disc player (LDP), or a Hi-Vision signal sending-out device, the video-signal sending-out device of computer graphics, etc. are used here as source of video signal 16 for left eyes L, or source of video signal 16 for right eyes R. Moreover, in order to synchronize a projection image on either side, the synchronizing signal generator 17 is connected common to the sources 16L and 16R of a video signal on either side, and the synchronous drive of the sources 16L and 16R of a video signal is carried out based on the synchronizing signal which this synchronizing signal generator 17 generates.

[0014] By the way, although change is seen in the polarization direction neither about vertical polarization nor horizontal polarization when there are two kinds of light which polarization required like common knowledge, the linearly polarized light and the circular polarization of light, and the linearly polarized light is reflected with a reflecting mirror 13, it is also known that the 90-degree polarization direction will change about 45 degree polarization of slanting. Therefore, 45 degree polarization of slanting which it was projected from liquid crystal projector 12 for right eyes R, and carried out incidence to the reflecting mirror 13 changes with reflection to 45 degree polarization of reverse slanting. More in detail, as shown in drawing 2, it is the linearly polarized light. If Normal t is stood in the probe index to a reflecting mirror 13, the flat surface containing Normal t sets to y the line which crosses the reflector of a reflecting mirror 13 and the straight line within the reflector 13 which intersects perpendicularly with Line y is set to x and x -- although t and y intersect perpendicularly mutually further -- general -- the wave which is vibrating in the field containing t and y -- p wave The wave which is vibrating in the field containing x is called s wave. However, as the light which is not p wave or s wave, either, and carries out incidence to a reflecting mirror 13 while vibrating in the 45-degree direction to x and y was shown in drawing 3, the 90 degrees of the oscillating directions will be bent by reflection.

[0015] That is, like an example, the projection image for right eyes reflected with a reflecting mirror 13 serves as 45 degree linearly polarized light of reverse slanting to the projection image for left eyes which is not reflected with a reflecting mirror 13 being 45 degree linearly polarized light of slanting, and the image for left eyes projected on a screen 14 and the image for right eyes will have the polarization direction which intersects perpendicularly mutually. And since the polarization glasses 15 for stereoscopic vision attach the linearly polarized light plate which has the 45-degree polarization direction in the object for left eyes, and right eyes and which intersects perpendicularly mutually and are constituted, the projection image of the right and left projected on the screen 14 can carry out the separation check by looking of them clearly as the image for left eyes, and an image for right eyes with the polarization glasses 15.

[0016] Thus, that what is necessary is just to prepare two liquid crystal projectors 12L and 12R of the same specification on which the polarization direction projects the same image according to the above-mentioned liquid crystal projection arrangement 11 for stereoscopic vision It compares with a color projection CRT. The far compact liquid crystal projectors 12L and 12R That what is necessary is just to

install in the condition that the mirror image and liquid crystal projector 12L of another side by the reflecting mirror 13 of one liquid crystal projector 12R have the same placing include angle theta to a screen 14. Moreover, since it is released from the excessive magnitude and the weight of equipment which obstruct the spread as home use that what is necessary is just to arrange a reflecting mirror 13 so that the projection image of liquid crystal projector 12L of another side may not be kicked, spread at ordinary homes can be aimed at widely. Moreover, since it can adjust, for example to liquid crystal projector 12R by attached quantity of light *****, an image on either side can be made to project on a screen 14 by the same brightness also about the quantity of light decreased by reflection it is also possible to build a solid visual system by adding liquid crystal projector 12R of the same mold and the set of a reflecting mirror 13 to its purchase, and according to a reflecting mirror 13 at a home [finishing / one set purchase of liquid crystal projector 12L / already].

[0017] In addition, although the case where the liquid crystal projectors 12L and 12R of the pair which outputs the projection image of 45-degree linearly polarized light were used was taken for the example in the above-mentioned example, the circle deviation projection mold which projects the image which has the circular polarization of light which circles in both the directions of ** - as liquid crystal projector 12L for left eyes and liquid crystal projector 12R for right eyes R can also be used. If liquid crystal projector 12L for left eyes is projected on the direct screen 14 in this case, and the projection image of liquid crystal projector 12R for right eyes is reflected once with a reflecting mirror 13 and it projects on a screen 14, as shown in drawing 4. Since it has the property in which the revolution direction serves as reverse revolution by being reflected with a reflecting mirror 13, the circular polarization of light can be separated and seen through the polarization glasses incorporating the circular polarization of light plate which corresponds the image for left eyes of the circular polarization of light projected directly, and the image for right eyes which was reflected with the reflecting mirror 13 and considered as reverse revolution. That is, stereoscopic vision as well as the case where 45-degree linearly polarized light projection mold liquid crystal projector is used is possible.

[0018] Moreover, even if it does not use a circle deviation projection mold, the liquid crystal projectors 12L and 12R of a linearly polarized light projection mold can be used as they are, and stereoscopic vision with the deviation glasses of a circle deviation mold can also be made possible. That is, as shown in the liquid crystal projection arrangement 21 for stereoscopic vision shown in drawing 5, the linearly polarized light is changeable into the circular polarization of light by making a polarization shaft and the include angle of 45 degrees, and arranging the quarter-wave length plate 22 in the front face of a projection lens. In this case, although the projection image of liquid crystal projectors 12L and 12R is changed into the circular polarization of light using the quarter-wave length plate 22, stereoscopic vision becomes possible in order that the polarization direction of one projection image may reverse-circle with a reflecting mirror 13. The linearly polarized light projection mold liquid crystal projectors 12L and 12R of the pair with the same polarization direction can be used for the liquid crystal projection arrangement 21 for stereoscopic vision, and since the thing of the same specification can be used for it by right and left also about the quarter-wave length plate 22 which moreover changes the linearly polarized light to the circular polarization of light, it can manufacture them cheaply, without increasing the class of use components.

[0019] moreover, the above -- although any example was considered as the configuration which reflects the projection image of liquid crystal projector 12R for right eyes with a reflecting mirror 13, the projection image of liquid crystal projector 12L for left eyes is reflected with a reflecting mirror, and the projection image of liquid crystal projector 12R for right eyes can also be considered as the configuration projected on the direct screen 14.

[Translation done.]

* NOTICES *

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the outline block diagram showing 1 operation gestalt of the liquid crystal projection arrangement for stereoscopic vision of this invention.

[Drawing 2] It is drawing for explaining the relation of the reflecting mirror and the linearly polarized light which were shown in drawing 1 .

[Drawing 3] It is the explanatory view showing that 45-degree linearly polarized light turns at 90 degrees with a reflecting mirror.

[Drawing 4] The circular polarization of light is the explanatory view showing reverse-circling with a reflecting mirror.

[Drawing 5] It is the outline block diagram showing other operation gestalten of the liquid crystal projection arrangement for stereoscopic vision of this invention.

[Drawing 6] It is the outline block diagram showing an example of the conventional projection CRT equipment for stereoscopic vision.

[Description of Notations]

11 21 Liquid crystal projection arrangement for stereoscopic vision

12L, 12R Liquid crystal projector

13 Reflecting Mirror

14 Screen

15 Polarization Glasses

16L, 16R Source of a video signal

17 Synchronizing Signal Generator

22 Quarter-wave Length Plate

[Translation done.]

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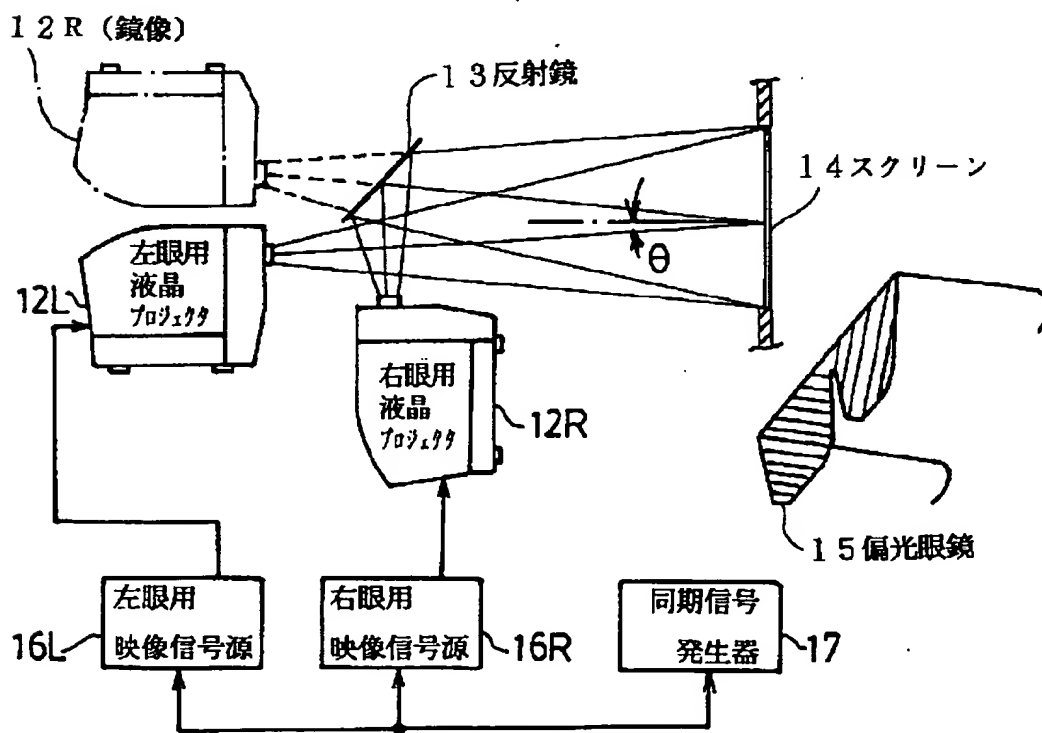
1. This document has been translated by computer. So the translation may not reflect the original precisely.
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DRAWINGS

[Drawing 1]

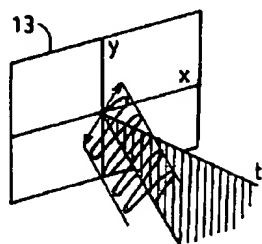
本発明の立体視用液晶投写装置の一実施形態を示す概略構成図

1.1 立体視用液晶投写装置



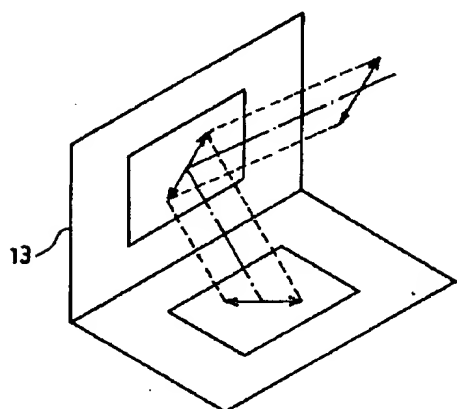
[Drawing 2]

反射鏡に入射する光の偏光方向の説明図



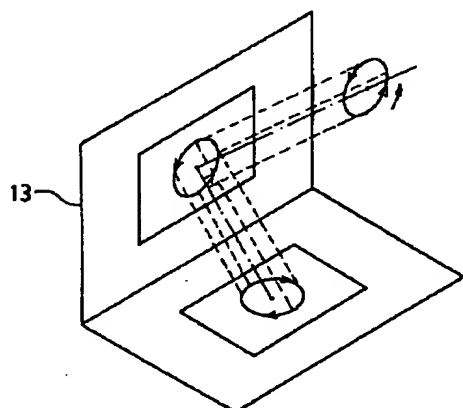
[Drawing 3]

45° 偏光が鏡により90° 曲げられる場合の説明図



[Drawing 4]

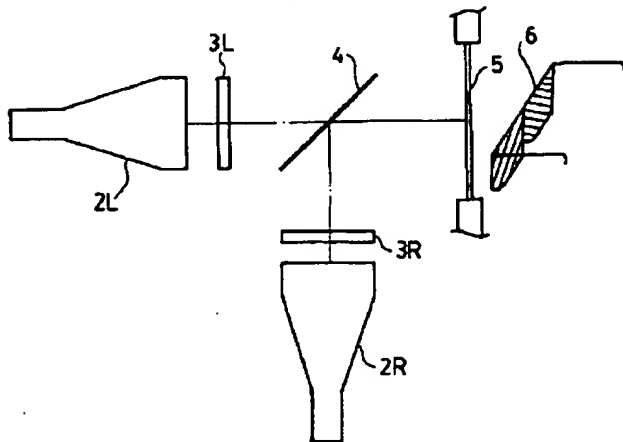
円偏光が鏡により逆旋回することを示す説明図



[Drawing 6]

従来の立体視用投写装置の一例を示す概略構成図

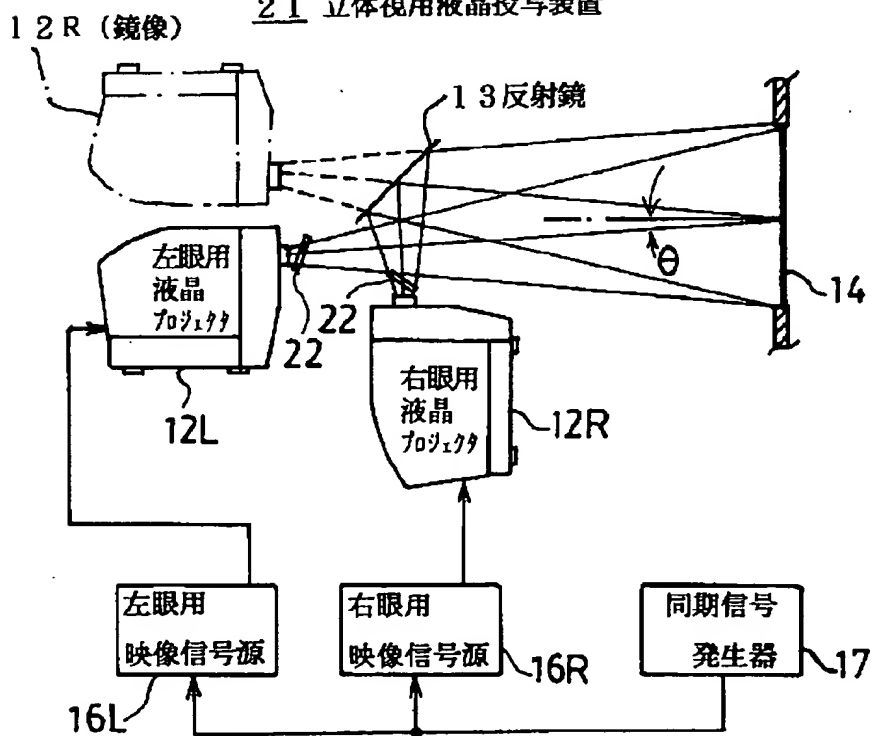
1 立体視用投写装置



[Drawing 5]

本発明の立体視用液晶投写装置の他の実施形態を示す概略構成図

2.1 立体視用液晶投写装置



[Translation done.]